

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 6712WO:ME	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 97/ 00096	International filing date (day/month/year) 10/01/1997	(Earliest) Priority Date (day/month/year) 11/01/1996
Applicant MARGETSON, Guy E.J.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).
2. ☐ Unity of invention is lacking (see Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
 - ☐ filed with the international application.
 - ☐ furnished by the applicant separately from the international application,
 - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
 - ☐ Transcribed by this Authority
4. With regard to the title, ☒ the text is approved as submitted by the applicant
 - ☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,
 - ☒ the text is approved as submitted by the applicant.
 - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:
 - Figure No. 1 ☒ as suggested by the applicant. ☐ None of the figures.
 - ☐ because the applicant failed to suggest a figure.
 - ☐ because this figure better characterizes the invention.

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G09F19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 24 61 140 B (A. WEINGARTNER) 4 December 1975 see the whole document ---	1-15
A	EP 0 390 749 A (INNOVAZIONE) 3 October 1990 see the whole document ---	1-15
A	GB 2 241 813 A (G. HELCKE) 11 September 1991 see the whole document -----	1-15



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
 "&" document member of the same patent family

Date of the actual completion of the international search

3 April 1997

Date of mailing of the international search report

09.04.97

Name and mailing address of the ISA

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 NL - 2280 HV Rijswijk
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Gallo, G

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 97/00096

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2461140 B	04-12-75	DE 2461140 A	04-12-75
EP 390749 A	03-10-90	NONE	
GB 2241813 A	11-09-91	NONE	

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
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GA	Gabon			VN	Viet Nam

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VISUAL INFORMATION SYSTEMS

The present invention relates to visual information systems.

Advertising is often presented in illuminated form consisting of an array of fluorescent lights. Such lights are usually switched on during the hours of darkness. The array occupies the same area as the image presented and consumes relatively large amounts of energy. Such systems are relatively inflexible in as much as the whole array needs to be rebuilt to display another image.

Other arrays of moving images are known in which an array consisting of a plurality of rows and columns of light sources are individually energisable to produce, for example, a moving message. Such arrays have several times more columns of light source than rows. Also, the size of the array is the same size as the image and consequently the wiring of individual light sources to the controlling circuitry and the complexity of the control circuitry are likely to be very costly.

It is an object of the invention to provide an improved visual information system.

According to the present invention there is provided a visual information system comprising an array consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span in accordance with the predetermined program stored on the memory so that a viewer observing the array and being carried past the array at a predetermined speed will observe immediately following said predetermined time span the said predetermined image as an apparently stationary image occupying an area substantially larger than the area of

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said array.

According to the present invention there is further provided a visual information display system comprising a fibre optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns and the ends of the individual fibres at the opposite end of the bundle are connected to an elctro-optical interface unit, and means for supplying electrical signals to the interface unit to cause the array to display a succession of images in sufficiently quick succession that a viewer being carried past the array perceives a single horizontally elongate display consisting of said successive images located side by side.

Visual information system embodying the invention will now be described, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a front elevation of the system;
Figure 2 is a block diagram of the system;
Figure 3 is a more detailed block diagram of the system;

Figure 4 is a block diagram of another form of system embodying the invention; and

Figure 5 is an end view of a train passing through a tunnel and illustrating the positioning of the system.

The visual information system to be described is arranged to be located in tunnels through which public transportation vehicles such as tube trains normally run. The system consists of a series of light source arrays 2 arranged at spaced intervals along the track 4 on the side wall of the tunnel, generally level with the windows of the train so that the arrays can be viewed by the passengers in the train. A sensor 6 located upstream of

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each array 2 is responsive to the approach of the train to the array to actuate the array. Another sensor 8 located downstream of each array is responsive to when the train has passed to deactivate the array 2. The sensors 6 and 8 may take the form of infrared transmitter and receiver pairs.

Each array 2 consists of four columns and sixty four rows of individually and selectively energisable light sources for example light emitting diodes.

Selected light sources in the array are switched ON and OFF by a controller 10 in accordance with a predetermined program stored in a memory 12. The controller is triggered by the sensor 6 and the program is cyclically repeated until a signal is received from the sensor 8.

The switching rate of the light sources and the duration of their energisation is such that a passenger sitting in the train and keeping his eyes directed at the array will observe an image several times wider than the width of the array.

The effect is achieved because with light flashes of very short duration, the reaction of the human eye to the flash persists long after the flash has finished. Thus, where a series of very short flashes occur over a short time span less than 0.015 seconds, all the flashes appear to the eye to have occurred at the same time and when the flashes are spaced from one another on the retina because the viewer has moved relative to the array, the eye perceives a composite light pattern which will persist for a short while immediately following the time span. It will thus be appreciated that a program can be created and stored in the memory 12 which will produce almost any desired image for the observer. The image may take the form of alpha numeric information or may take the form of an advertising poster.

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The block diagram of the system is more clearly shown in Figure 3.

As can be seen, the array 2 consists of a series of light emitting diodes 20. In this arrangement only sixteen are shown, arranged in a single column. Each LED has a power output of 32 mcd's and has a high switching speed with a switching time faster than 10 nanoseconds.

The controller 10 includes a driver 22 which acts to drive the LED's 20 through respective resistors 24. The driver 22 is controlled by a central processing unit (CPU) 26 which derives its instructions from terminal 1 of the memory 12 via resistors R36 and R34 which feed terminal 5 of the CPU. The memory 12 is in the form of an erasable programmable read only memory (EPROM).

The CPU 26 is triggered into action by a signal received on terminal 28 from the sensor 6.

The CPU cyclically repeats the program stored in the EPROM 12 at a repetition rate in the range of from 10-50 Hz but is preferably 15 Hz.

By updating the memory periodically the passengers will be able to observe different images.

When a large plurality of arrays are provided they can be divided into groups with the memory of the system in each group being updatable simultaneously. A central computer (not shown) is provided to store a plurality of different programs. The central computer is connected to each group to update the memory in each group with a new program depending either upon the time of day or the location of the group.

When a colour image is required, each light source of the array can be replaced by a row consisting of red, green and blue elements or a row consisting of red, green, blue and white light elements. Each element is selectively energisable. It will be appreciated that by having the program determine, the period of energisation

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of each light source, the shade of colour in the final image can be varied as required.

While the rows and columns in each memory can be varied, it is preferable that the ratio of rows to columns in the array is 16:1 or greater.

In the embodiment shown in Figure 4, the optical array 20 consists of an array formed by the exposed ends of a bundle 22 of optical fibres. The opposite ends of the elctro-optical fibres of the bundle 22 are connected to an electro-optical interface unit 24. Data representative of a desired image to be displayed is transmitted from a central computer 32 by radio optical or direct wire link to a data interface unit 30 which passes the signals to a processor 28 which in turn causes the signals to be stored in a storage unit 26. The processor 28 is responsive to a local trigger such as the sensors 6 and 8 described in connection with Figures 1 and 2 or a remote trigger, to cause the elctro-optical interface to read out the stored data from the memory 26 and to cause the corresponding image to be progressively reproduced on the display 20 in a manner such as that described in conjunction with Figures 1 to 3.

The central computer 32 can be programmed to send different displays to different groups of optical arrays as required and alter the displays stored by the memories 26 at different times of the day, week and/or month.

In the embodiment show in Figure 5, a train 36 within a tunnel 34 carries an on-board transmitter 38 which is connected to an on-board or a remote central computer 32. Data from the computer 32 is transmitted by the transmitter 38 to a receiver 40 adjacent a display 20 mounted on the wall of the tunnel. The receiver is connected to the data interface 30 (see Figure 4) of the display from whereon the system operates in the same

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manner as described in connection with Figure 4.

The transmitter and receiver may be acoustic, optical or radio. Also, the train may have an on-board speed monitor and data representative of the speed of the train transmitted to the processor 28 so that the processor can modify the rate that the electro-optical interface reads signals from the memory 26 in a manner to synchronise the display with the speed of the train.

In a modification, instead of the interface 24 reading signals from the memory 26, the memory 26 can be omitted and the signals read in real time from the processor 28.

CLAIMS

1. A visual information system comprising an array consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a
5 memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span in accordance with the predetermined program stored on the memory so
10 that a viewer observing the array and being carried past the array at a predetermined speed will observe immediately following said predetermined time span the said predetermined image as an apparently stationary image occupying an area substantially larger than the area of
15 said array.
2. A system according to Claim 1, including sensing means for monitoring the passage of a carrier carrying said viewer past the array to trigger said controller into action.
- 20 3. A system according to Claim 2, wherein said sensing means comprises infrared sensing means arranged to activate said controller upon the approach of said carrier to the array and to deactivate the controller upon the departure of said carrier away from said array.
- 25 4. A system according to Claim 3, wherein the sensing means comprises a first infrared transmitter and receiver pair located upstream of the array and a second infrared and transmitter pair located downstream of the array.
- 30 5. A system according to any preceding claim, wherein the controller is arranged to cyclically repeat the energisations specified by the predetermined program at regular intervals.
- 35 6. A system according any preceding claim, wherein the array consists of light sources of different colours

and wherein the predetermined program specifies different durations of energisation of the different coloured light sources.

7. A system according any preceding claim, wherein
5 said controller is arranged to complete one cycle of the predetermined program within a period of 0.015 seconds.

8. A system according to any preceding claim,
wherein the ratio of rows to columns in the array is 16:1
or greater.

9. A system according to Claim 1, wherein each
10 light source comprises a light emitting diode and the controller includes a driver for driving each light emitting diode, the driver being arranged to vary the period for which its corresponding diode is energised in
15 accordance with the program stored in the memory.

10. An arrangement comprising a plurality of systems
each according to any preceding claim and a main computer
arranged to store a plurality of different programs each
representing a respective image, said main computer being
20 operable to replace the program stored in said memories
with a program stored in said main computer.

11. An arrangement according to Claim 10, wherein
said main computer is programmed to replace the program
stored in selected ones of the memories in accordance with
25 the time of day.

12. An arrangement according to Claim 10 or
Claim 11, wherein the computer is programmed to replace
the program stored in selected ones of the memories in
accordance with the location of their associated arrays.

13. A visual information display system comprising a
30 fibre optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns and the ends of the individual
35 fibres at the opposite end of the bundle are connected to

an elctro-optical interface unit, and means for supplying electrical signals to the interface unit to cause the array to display a succession of images in sufficiently quick succession that a viewer being carried horizontally past the array perceives a single horizontally elongate display consisting of said successive images located side by side.

14. A display system according to Claim 13, including a remote computer for generating data representative of a desired display, a local data interface for receiving the data, and a processor for processing the received data and storing it in a memory, the processor being arranged to control the interface unit to respond to the data stored in the memory.

15. A display system according to Claim 13 or Claim 14, wherein the array is mounted on the wall of a train tunnel and an on-board transmitter on a passing train transmits the data from the computer to supply the interface unit with said data.

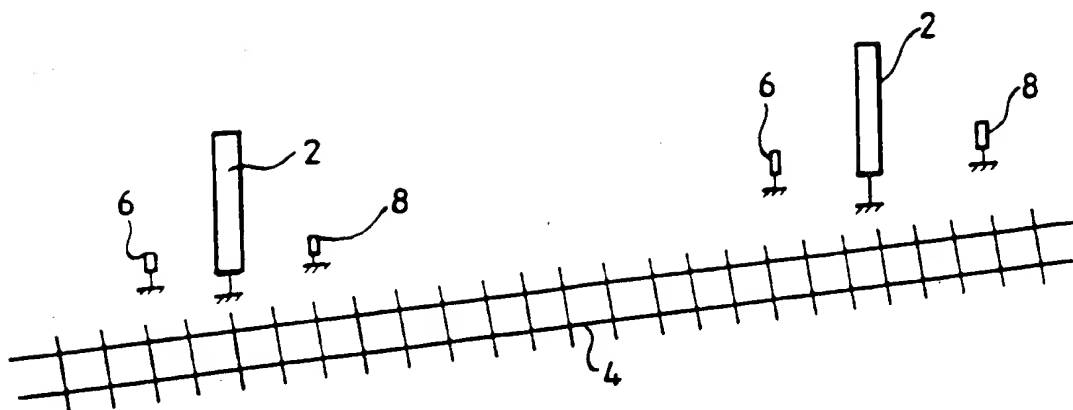


Fig.1.

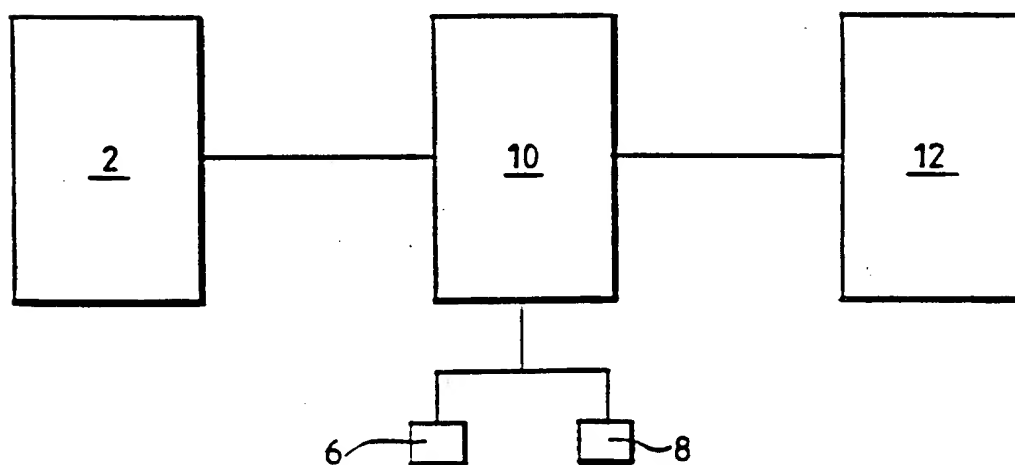
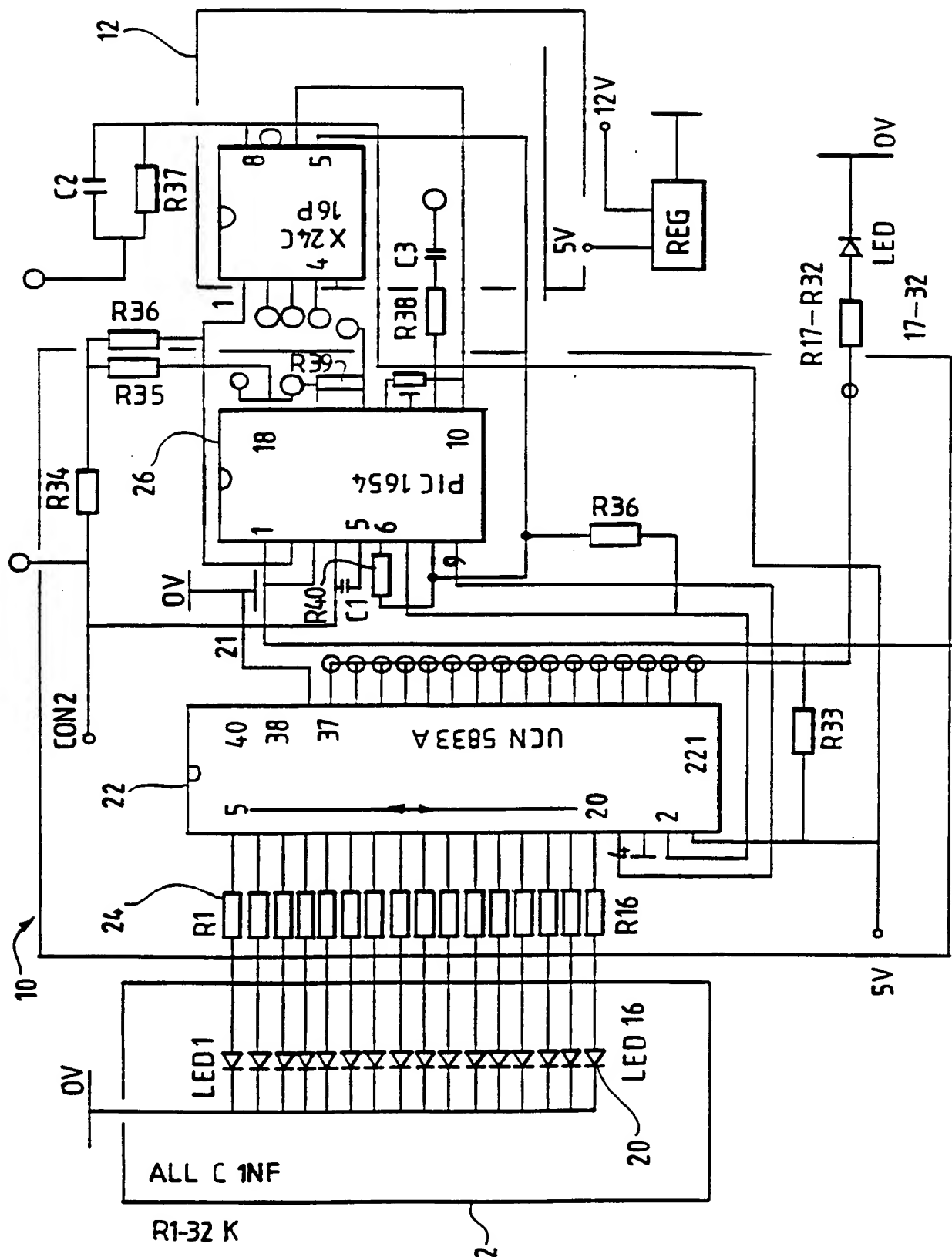


Fig.2.

-213



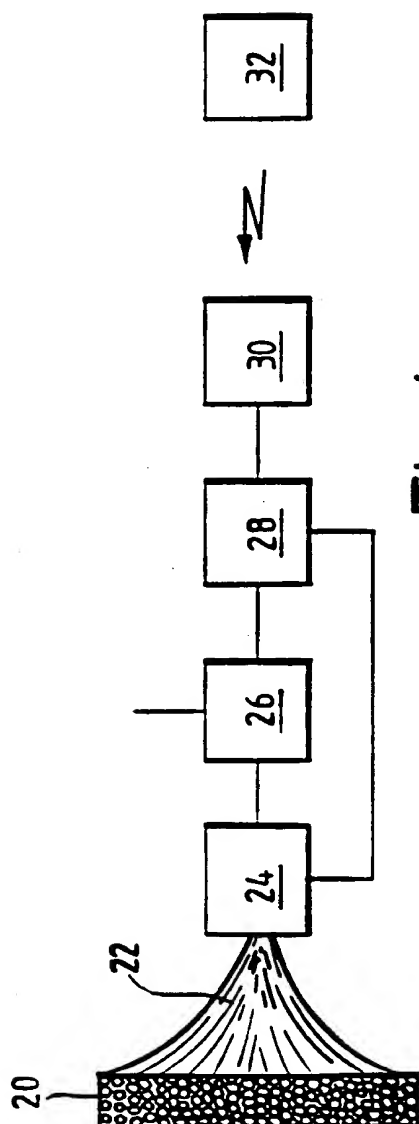


Fig. 4.

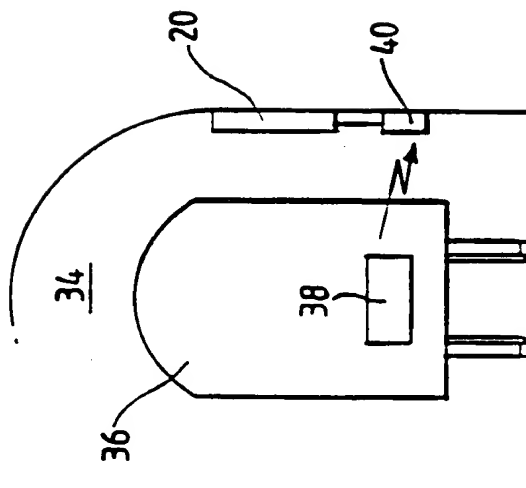


Fig. 5.

INTERNATIONAL SEARCH REPORT

International Application No

PC1/GB 97/00096

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G09F19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 24 61 140 B (A. WEINGARTNER) 4 December 1975 see the whole document ---	1-15
A	EP 0 390 749 A (INNOVAZIONE) 3 October 1990 see the whole document ---	1-15
A	GB 2 241 813 A (G. HELCKE) 11 September 1991 see the whole document -----	1-15

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

3 April 1997

Date of mailing of the international search report

09.04.97

Name and mailing address of the ISA

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Authorized officer

Gallo, G

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 97/00096

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2461140 B	04-12-75	DE 2461140 A	04-12-75
EP 390749 A	03-10-90	NONE	
GB 2241813 A	11-09-91	NONE	

PATENT COOPERATION TREATY

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 25 August 1997 (25.08.97)	
International application No. PCT/GB97/00096	Applicant's or agent's file reference 6712WO:ME
International filing date (day/month/year) 10 January 1997 (10.01.97)	Priority date (day/month/year) 11 January 1996 (11.01.96)
Applicant MARGETSON, Guy, Edward, John et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
08 August 1997 (08.08.97)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Jocelyne REY-MILLET Telephone No.: (41-22) 338.83.38
--	---

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

RECEIVED	05 FEB 1998
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Applicant's or agent's file reference 6712WO:ME	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (PCT/IPEA/416)
International application No. PCT/GB97/00096	International filing date (day/month/year) 10/01/1997	Priority date (day/month/year) 11/01/1996	
International Patent Classification (IPC) or national classification and IPC G09F19/22			
Applicant MARGETSON, Guy E.J.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 08/08/1997	Date of completion of this report 02.02.98
Name and mailing address of the IPEA/ <div style="display: flex; align-items: center;"> <div> <p>European Patent Office</p> <p>D-80298 Munich</p> <p>Tel. (+49-89) 2399-0, Tx: 523656 epmu d</p> <p>Fax: (+49-89) 2399-4465</p> </div> </div>	Authorized officer Bridge, S Telephone No. (+49-89) 2399-2837



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB97/00096

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-6 as originally filed

Claims, No.:

1-15 as received on 14/01/1998 with letter of 08/01/1998

Drawings, sheets:

1/3-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB97/00096

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-15
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V Statement according to Article 35(2) – Novelty, inventive step & industrial applicability

- 1 **Closest prior art** : D1 = EP-A-0 390 749 discloses a visual information display system (eg a road sign) for use in connection with a carrier for carrying observers along a predetermined path, the display comprising a fibre optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns (figure 5) and the ends of the individual fibres at the opposite end of the bundle are connected to an electro-optical interface unit, and means for supplying electrical signals to the interface unit to cause the array to display a succession of images.

Documents D2 = DE-A-2 461 140, D3 = GB-A-2 241 813 and D4 = US-A-2 299 731 all disclose visual information display systems for use in connection with a railway carrier carrying observers along a predetermined path, the display comprising a succession fixed image panels illuminated by stroboscopic lighting such that an observer carried by the carrier past the succession fixed image panels will observe an apparently stationary image.

Problem : provide an improved visual information system (page 1 lines 20-21).

Solution : According to claim 1 and claim 13 the visual information system comprises an array of individually and selectively energisable light sources arranged in rows and columns, a memory driving a controller for energising the light sources in accordance with the speed of the observers on the carrier and the persistence time of the human retina to light such that the observers perceive an apparently stationary image occupying an area substantially larger than the area of the array. In claim 13 the array is formed by the ends of optical fibres. Such a solution is neither disclosed nor suggested in any of the available prior art. Therefore, the subject matter of the independent claims satisfies the criteria set forth in Articles 33(2)-33(4) PCT.

- 2 The dependent claims concern further technical details of the invention and are carried by the inventive idea of the independent claims. Therefore, the dependent claims also satisfy the criteria set forth in Articles 33(2)-33(4) PCT.

VII Certain defects

- 1 Reference signs in parentheses should have been inserted in the claims to

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB97/00096

increase their intelligibility, Rule 6.2(b) PCT.

- 2 The applicant has not brought the description into conformity with the claims. Thus, the requirements of Rule 5.1 (a)(ii)(iii) PCT are not fulfilled.
- 3 The documents D1 and at least one of D2, D3 or D4 have not been identified in the description nor as the relevant background art disclosed therein been discussed. The requirements of Rule 5.1(a)(ii) PCT are, thus, not fulfilled.

VIII Certain observations

- 1 Claim 13 does not meet the requirements of Article 6 PCT, because the expression "In a transport system, a path ... and a visual display system ..." is not clear as to what is being claimed : does the transport system form part of the subject matter of claim 13 or not. Claim 13 should have been clarified.
 - 1.1 In view of claim 15, the transport system would appear to have to be part of the claimed subject matter.
- 2 Page 5 lines 9 and 18 : "elctro-optical" should read "electro-optical".

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 6712WO:ME	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (PCT/IPEA/416)	
International application No. PCT/GB97/00096	International filing date (day/month/year) 10/01/1997	Priority date (day/month/year) 11/01/1996
International Patent Classification (IPC) or national classification and IPC G09F19/22		
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1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☒ Certain defects in the international application
 - VIII ☒ Certain observations on the international application

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB97/00096

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-6 as originally filed

Claims, No.:

1-15 as received on 14/01/1998 with letter of 08/01/1998

Drawings, sheets:

1/3-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-15
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V Statement according to Article 35(2) – Novelty, inventive step & industrial applicability

- 1 **Closest prior art** : D1 = EP-A-0 390 749 discloses a visual information display system (eg a road sign) for use in connection with a carrier for carrying observers along a predetermined path, the display comprising a fibre optic array in which one end of a bundle of optical fibres is arranged so that the ends of the individual fibres at one end of the bundle form a vertically elongate array of rows and columns (figure 5) and the ends of the individual fibres at the opposite end of the bundle are connected to an electro-optical interface unit, and means for supplying electrical signals to the interface unit to cause the array to display a succession of images.

Documents D2 = DE-A-2 461 140, D3 = GB-A-2 241 813 and D4 = US-A-2 299 731 all disclose visual information display systems for use in connection with a railway carrier carrying observers along a predetermined path, the display comprising a succession fixed image panels illuminated by stroboscopic lighting such that an observer carried by the carrier past the succession fixed image panels will observe an apparently stationary image.

Problem : provide an improved visual information system (page 1 lines 20-21).

Solution : According to claim 1 and claim 13 the visual information system comprises an array of individually and selectively energisable light sources arranged in rows and columns, a memory driving a controller for energising the light sources in accordance with the speed of the observers on the carrier and the persistence time of the human retina to light such that the observers perceive an apparently stationary image occupying an area substantially larger than the area of the array. In claim 13 the array is formed by the ends of optical fibres. Such a solution is neither disclosed nor suggested in any of the available prior art. Therefore, the subject matter of the independent claims satisfies the criteria set forth in Articles 33(2)-33(4) PCT.

- 2 The dependent claims concern further technical details of the invention and are carried by the inventive idea of the independent claims. Therefore, the dependent claims also satisfy the criteria set forth in Articles 33(2)-33(4) PCT.

VII Certain defects

- 1 Reference signs in parentheses should have been inserted in the claims to

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EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB97/00096

increase their intelligibility, Rule 6.2(b) PCT.

- 2 The applicant has not brought the description into conformity with the claims. Thus, the requirements of Rule 5.1 (a)(ii)(iii) PCT are not fulfilled.
- 3 The documents D1 and at least one of D2, D3 or D4 have not been identified in the description nor as the relevant background art disclosed therein been discussed. The requirements of Rule 5.1(a)(ii) PCT are, thus, not fulfilled.

VIII Certain observations

- 1 Claim 13 does not meet the requirements of Article 6 PCT, because the expression "In a transport system, a path ... and a visual display system ..." is not clear as to what is being claimed : does the transport system form part of the subject matter of claim 13 or not. Claim 13 should have been clarified.
 - 1.1 In view of claim 15, the transport system would appear to have to be part of the claimed subject matter.
- 2 Page 5 lines 9 and 18 : "elctro-optical" should read "electro-optical".

CLAIMS

1. A visual information system for use in connection with a carrier for carrying observers along a predetermined path, the system comprising an array to be located adjacent said path and consisting of a plurality of individually and selectively energisable light sources arranged in rows and columns, a memory for storing a program representative of a predetermined image, a controller actuatable to control the selection and sequence of energisation of the light sources within a predetermined time span corresponding to the persistence time of the human retina to light, and in accordance with ... the predetermined program stored in the memory, the rate of operation of the controller being set to correspond with the speed of the carrier past the array whereby an observer carried by the carrier past the array will observe said predetermined image as an apparently stationary image occupying an area substantially larger than the area of said array.
2. A system according to Claim 1, including sensing means for monitoring the passage of a carrier carrying said viewer past the array to actuate said controller.
3. A system according to Claim 2, wherein said sensing means comprises infrared sensing means arranged to activate said controller upon the approach of said carrier to the array and to deactivate the controller upon the departure of said carrier away from said array.
4. A system according to Claim 3, wherein the sensing means comprises a first infrared transmitter and receiver pair located upstream of the array and a second infrared receiver and transmitter pair located downstream of the array.
5. A system according to any preceding claim, wherein the controller is arranged to cyclically repeat the energisations specified by the predetermined program

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at regular intervals.

6. A system according any preceding claim, wherein
the array consists of light sources of different colours
and wherein the predetermined program specifies different
5 durations of energisation of the different coloured light
sources.

7. A system according any preceding claim, wherein :...:
said controller is arranged to complete one cycle of the
predetermined program within a period of 0.015 seconds.

10 8. A system according to any preceding claim,
wherein the ratio of rows to columns in the array is 16:1
or greater.

9. A system according to Claim 1, wherein each
light source comprises a light emitting diode and the
15 controller includes a driver for driving each light
emitting diode, the driver being arranged to vary the
period for which its corresponding diode is energised in
accordance with the program stored in the memory.

10 10. An arrangement comprising a plurality of systems
each according to any preceding claim and a main computer
arranged to store a plurality of different programs each
representing a respective image, said main computer being
operable to replace the program stored in said memories
with a program stored in said main computer.

25 11. An arrangement according to Claim 10, wherein
said main computer is programmed to replace the program
stored in selected ones of the memories in accordance with
the time of day.

12. An arrangement according to Claim 10 or
30 Claim 11, wherein the computer is programmed to replace
the program stored in selected ones of the memories in
accordance with the location of their associated arrays.

13. In a transport system, a path along which
carriers can pass and a visual display system located
35 adjacent said path, the display system comprises a fibre

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optic array in which one end of a bundle of optical fibres
is arranged so that the ends of the individual fibres at
one end of the bundle form a vertically elongate array of
rows and columns and the ends of the individual fibres at
5 the opposite end of the bundle are connected to an
electro-optical interface unit, control means for
supplying electrical signals to the interface unit to
cause the array to display a succession of images and
means for controlling the rate at which the control means
10 supplies said signals in accordance with the speed of the
carrier past the system, and within a time frame related
to the persistence time of the human retina to light,
whereby an observer on the carrier will perceive
apparently simultaneously a single horizontally elongate
15 display consisting of said successive images located side
by side.

14. A system according to Claim 13, wherein the
control means includes a remote computer for generating
data representative of a desired display, a local data
20 interface for receiving the data, and a processor for
processing the received data and storing it in a memory,
the processor being arranged to control the interface unit
to respond to the data stored in the memory.

15. A display system according to Claim 14, wherein
25 the carrier is a train, the path is defined by a train
tunnel, and the array is mounted on the wall of the train
tunnel and further comprising an on-board transmitter on a
passing train to transmit data to the computer to supply
the interface unit with said data.

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